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09/608,406	06/30/2000	William A. Thompson	Thompson 6	9899

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Docket Administrator (Rm 3C-512)
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EXAMINER	
PHAN, HANH	

ART UNIT	PAPER NUMBER
2633	7

DATE MAILED: 01/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/608,406	THOMPSON, WILLIAM A.	
	Examiner	Art Unit	
	Hanh Phan	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2000*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,12-18 and 21-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,12-18 and 21-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This Office Action is responsive to the Amendment filed on 08/04/2003.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 12, 13, 21, 23 and 25-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Sakamoto et al (US Patent No. 6,490,064).

Regarding claim 1, referring to figures 16-20, Sakamoto discloses a system for bi-directional transmission of optical signals over a single optical medium (i.e., optical fiber transmission path 224) coupled between at least two nodes (i.e., optical transmission and reception apparatus 212 and 213, Fig. 16), the system utilizing a first optical transmission band for signals traveling in a first direction (i.e., transmitters 220 of optical transmission and reception apparatus 212 generate optical signals of different wavelengths and a multiplexer 221 which wavelength multiplexes optical signals to provide a first optical transmission band for signals traveling in a first direction to receivers 223 of optical transmission and reception apparatus 213, Figs. 16 and 18) and a second optical transmission band for signals traveling in a second direction (i.e.,

transmitters 220 of optical transmission and reception apparatus 213 generate optical signals of different wavelengths and a multiplexer 221 which wavelength multiplexes optical signals to provide a second optical transmission band for signals traveling in a second direction to receivers 223 of optical transmission and reception apparatus 212, Figs. 16 and 18), the system comprising:

at least a first combiner/separator unit at a first of the two nodes (i.e., a first circulator filter 225 at the optical transmission and reception apparatus 212, Figs. 16 and 18), the first combiner/separator including an input port, an output port and a bi-directional input/output port for coupling to the single optical medium (i.e., circulator filter 225 including an input port from multiplexer 221 to circulator filter 225, an output port from circulator filter 225 to demultiplexer 222, and a bi-directional input/output port from circulator filter 225 for coupling to the single optical medium 224, Figs. 16 and 18), a first optical filter within the first combiner/separator unit coupled to each of the ports therein, the optical filter being substantially transmissive to optical signals of the first band entering the input port and exiting on the bi-directional input/output port and the filter being substantially reflective for signals of the second band entering the bi-directional input/output port and exiting on the output port (inherently, circulator filter 225 as described above being substantially transmissive to optical signals of the first band entering the input port and exiting on the bi-directional input/output port and the circulator filter 225 being substantially reflective for signals of the second band entering the bi-directional input/output port and exiting on the output port, Figs. 16-20, col. 11,

lines 45-56, col. 12, lines 1-6, 44 and 56-64, col. 13, lines 16-39, line 44 and lines 58-64); and

at least a second combiner/separator unit at a second of the two nodes (i.e., similarly as described above, a second circulator filter 225 at the optical transmission and reception apparatus 213, Figs. 16 and 18), the second combiner/separator (i.e., circulator filter 225) including an input port, an output port and a bi-directional input/output port coupled to the optical medium (i.e., optical fiber transmission 224), a second optical filter within the second combiner/separator unit (i.e., filter 225) coupled to each of the ports therein of the second combiner /separator unit, the second optical filter (i.e., circulator filter 225) being substantially transmissive to optical signals of said second band entering the input port and exiting on the bi-directional input/output port and the filter being substantially reflective for signals of the first band entering the bi-directional input output port and exiting on the single direction output port (Figs. 16-20).

Regarding claims 2, 12, 13, and 21, referring to figures 16-20, Sakamoto further teaches at least one intermediate node (i.e., one repeater node including elements 225, 280, 281, 225 coupled between the first and second end node), said intermediate node comprising:

at least one the first combiner/separator unit (i.e., a first circulator filter 225)(Fig. 18) and at least one second combiner/separator unit (i.e., a second circulator filter 225)(Fig. 18), and

at least a first and second optical amplifier (280, 281)(Fig. 18), the output port of the first combiner/separator unit (i.e., first circulator filter 225) coupled to the input port

of the second combiner/separator unit (i.e., second circulator filter 225) through the first optical amplifier (280), the output port of the second combiner/separator unit (i.e., second circulator filter 225) coupled to the input port of the first combiner/separator unit (i.e., first circulator filter 225) through the second optical amplifier (281)(see Fig. 18);

the first and second combiner/separator units (i.e., first and second circulator filters 225) being alternately coupled within the bi-directional transmission system such that pairs of the first and second combiner/separator units are utilized in combination, the bi-directional ports of the combiner/separator units being coupled to one another (col. 11, lines 45-56, col. 12, lines 1-6, 44 and 56-64, col. 13, lines 16-39, line 44 and lines 58-64).

Regarding claim 23, referring to figures 16-20, Sakamoto teaches apparatus, comprising:

means for filtering (i.e., circulator filter 225), and

means for transmitting a first signal in a first signal band from a first path (i.e., the waveband from transmission circuit 210 of apparatus 212 traveling in from 212 to apparatus 213 can be considered as "first band" and the wave band from transmission circuit 210 of apparatus 213 traveling from 213 to apparatus 212 can be considered as "second band") onto an optical medium (i.e., optical fiber transmission line 224) via said means (i.e., circulator filter 225) for filtering, said means (i.e:, circulator filter 225) for filtering being substantially transmissive to signals in the first signal band and reflecting a second signal in a second signal band received from the optical medium onto a path

separate from the first path (col. 11, lines 45-56, col. 12, lines 1-6, 44 and 56-64, col. 13, lines 16-39, line 44 and lines 58-64).

Regarding claims 25 and 28, Sakamoto further teaches wherein the means for transmitting the first signal (Figs. 1, 2 and 5) comprises:

means for modulating (i.e., modulator 12), multiplexing (optical multiplexer 13), and amplifying (i.e., optical amplifier 14) a plurality of input signals to form the first signal, and

wherein the apparatus further connects to the optical medium (Figs. 1, 2 and 5).

Regarding claims 26 and 29, Sakamoto teaches further comprising means for amplifying (31A, 31B)(Fig. 5), demultiplexing (42), and demodulating the second signal (col. 6, lines 51-67, col. 7, lines 1-10 and col. 13, lines 16-39).

Regarding claim 27, Sakamoto further teaches the means (i.e., circulator filter 225) for filtering comprises:

an input port for receiving the first signal from the first path,

a bi-directional input/output port for applying the first signal to the optical medium and for receiving the second signal from said optical medium, and

a reflection port for applying the second signal to the separate path (Figs. 16-20).

4. Claims 23-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Islam (US Patent No. 6,631,028).

Regarding claim 23, referring to figures 6b, 7b, 8b, 9b, 10b and 11b, Sakamoto teaches apparatus, comprising:

means for filtering (100)(Fig. 6b), and

means (i.e., transmitter 92)(Fig. 6b) for transmitting a first signal in a first signal band (i.e., band #1, Fig. 6b) from a first path onto an optical medium (i.e., optical fiber transmission line 12, Fig. 6b) via said means (100) for filtering, said means (100) for filtering being substantially transmissive to signals in the first signal band (i.e., band #1) and reflecting a second signal in a second signal band (i.e., band #2) received from the optical medium onto a path separate from the first path (col. 4, lines 18-23 and lines 57-61 and col. 6, lines 35-50).

Regarding claims 24 and 30, Islam further teaches wherein one of the first and second signals is a C-band and the other is an L-band signal (Fig. 2b, col. 1, lines 58-67 and col. 4, lines 62-67)

Regarding claims 25 and 28, Islam further teaches wherein the means for transmitting the first signal comprises: means for modulating, multiplexing , and amplifying a plurality of input signals to form the first signal, and wherein the apparatus further connects to the optical medium (Figs. 6b-10b).

Regarding claims 26 and 29, Islam teaches further comprising means for amplifying, demultiplexing, and demodulating the second signal (Figs. 6b-10b).

Regarding claim 27, Islam further teaches the means (100)(Fig. 6b) for filtering comprises:

an input port for receiving the first signal from the first path,

a bi-directional input/output port for applying the first signal to the optical medium and for receiving the second signal from said optical medium, and

a reflection port for applying the second signal to the separate path (Figs. 6b-10b).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3, 18, 22, 24 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto et al (US Patent No. 6,490,064) in view of Kakui (US Patent No. 6,549,315).

Regarding claims 3, 18, 22, 24 and 30, Sakamoto discloses all the aspects of the claimed invention as set forth in the rejection to claims 1, 23 and 28 above, except fails to teach the optical transmission bands are L band and C-band. However, Kakui teaches an optical transmission system wherein the optical transmission bands are L band and C-band (Figs. 1 and 2, col. 4, lines 65-67, and col. 5, lines 1-14). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to use the optical transmission bands are L band and C-band as taught by Kakui in the system of Sakamoto. One of ordinary skill in the art would have been motivated to do this since Kakui suggests in column 1, lines 16-39 that using such optical transmission bands such as L band and C-band would minimize the transmission loss of optical fibers used as optical transmission line in the vicinity of a wavelength band as

C-band and L-band and allow a plurality of optical wavelength signals transmitted in a wide band with high speed and large capacity.

7. Claims 4-7, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto et al (US Patent No. 6,490,064) in view of Alexander et al (US Patent No. 6,233,077).

Regarding claims 4, 6 and 14, Sakamoto discloses all the aspects of the claimed invention as set forth in the rejection to claim 1 above, except fails to teach a first set of one or more optical translator units for translating received wavelengths to wavelengths of the first transmission band, the optical translator units being coupled to an optical multiplexer unit and an optical demultiplexer unit coupled to a second set of optical translator units for translating wavelengths of the second transmission band to said received wavelengths. However, Alexander teaches a first set of one or more optical translator units (i.e., optical remodulators 30)(Fig. 1) for translating received wavelengths to wavelengths of the first transmission band, and these optical translator units (optical remodulators 30) being coupled to an optical multiplexer unit (i.e., optical combiner 50)(Fig. 1) and an optical demultiplexer unit (i.e., optical splitter 90)(Fig. 1) coupled to a second set of optical translator units (i.e., remodulating selectors 100)(Fig. 1) for translating wavelengths of the transmission band to the received wavelengths (col. 4, lines 7-52, col. 7, lines 60-67, and col. 8, lines 1-39). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to add a optical translator unit at the output stage of each transmitter and add a optical translator

unit at the outputs from the optical demultiplexer in the system of Sakamoto as taught by Alexander. One of ordinary skill in the art would have been motivated to do this since Alexander suggests in column 4, lines 7-27 that using such optical translator units would allow the wavelengths emitted by the optical translator units are selected to be within the 1500 nanometer range, the range in which the minimum signal attenuation occurs for silica-based fibers.

Regarding claims 5, 7 and 15, Sakamoto further teaches the first node further includes at least one optical amplifier (280) coupled between an output of the multiplexer (221) and the input port of the first combiner/separator unit (i.e., circulator filter 225) and at least one optical amplifier (281) coupled between the output port of the first combiner/separator unit (i.e., circulator filter 225) and an input of the demultiplexer (222)(Fig. 18).

8. Claims 8, 9, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto et al (US Patent No. 6,490,064) in view of Alexander et al (US Patent No. 6,281,997).

Regarding claims 8, 9, 16 and 17, Sakamoto discloses all the aspects of the claimed invention as set forth in the rejection to claim 1 above, except fails to teach the filters are thin film wide-band filters (for claims 8 and 16) and the filters include a transmissive insertion loss in the range of 1.3 to 1.7 dB and reflective insertion loss in the range of 0.3 to 0.9 dB (for claims 9 and 17). However, Alexander in US Patent No. 6,281,997 teaches the filters (220)(Fig. 2) are thin film wide-band filters and the filters

include a transmissive insertion loss in the range of 1.3 to 1.7 dB and reflective insertion loss in the range of 0.3 to 0.9 dB (col. 3, lines 48-67 and col. 5, lines 14-22). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to use the thin film wide-band filters to modify the filters in the combiner/separator of the system of Sakamoto as taught by Alexander. One of ordinary skill in the art would have been motivated to do this since Alexander suggests in column 5, lines 14-22 that using such thin film wide-band filters would introduce little power loss to the selected sub-groups of channels. For example, the power loss associated with the channels reflected by the thin film filters is about 0.5 dB and the loss associated with the channels transmitted through the filter is about 0.7 dB.

Response to Arguments

9. Applicant's arguments filed 08/04/2003 have been fully considered but they are not persuasive.

The applicant's arguments to claims 1-9, 12-18, 21 and 22 are not persuasive. Applicant argues that Sakamoto reference fails to teach the limitation "**optical filter is substantially transmissive to optical signals of said first band ... and ... substantially reflective for signals of said second band**" in independent claims 1, 12 and 21. The examiner respectfully disagrees. As disclosed through out the patent of Sakamoto et al, the system illustrated in Figs. 16-20 is a bi-directional system with one band traveling in one direction and other band traveling in opposite direction (col. 11, lines 45-56, col. 12, lines 1-6, 44 and 56-64, col. 13 line 44, etc). Therefore, the wave

band from transmission circuit 210 of apparatus 212 traveling from 212 to apparatus 213 can be considered as "first band" and the wave band from transmission circuit 210 of apparatus 213 traveling from 213 to apparatus 212 can be considered as "second band". The circulator filter 225 on the apparatus 212 side corresponds to the "first combiner/separator unit" and the circulator filter 225 on the apparatus 213 side corresponds to the "second combiner/separator unit". First combiner/separator unit 225 on apparatus side 212 includes an input port (the port of circulator 225 connecting multiplexer 221 on side 212), an output port (the port of the circulator 225 connecting demultiplexer on side 212) and a bi-directional input/output port (the port of the circulator 225 connecting to fiber 224). Second combiner/separator unit 225 on apparatus side 213 includes an input port (the port of the circulator 225 on side 213 connecting to multiplexer), an output port (the port of the circulator 225 on side 213 connecting to demultiplexer 222), and a bidirectional input/out port (the port of the circulator 225 on side 213 connecting to fiber 224). With the above discussion, then Sakamoto et al does disclosed "the filter (the circulator filter 225 on side 212) being substantially reflective for signals of said second band (the band traveling from multiplexer on side 213 via the fiber 224 into bi-directional port of 225 on 212 side) entering said bi-directional input/output port (the band from side 213 entering the port of 225 on 212 side connecting the fiber 224) and exiting on output port (the band from side 213 entering the bi-directional port of 225 on side 212 is output on port which connects to the demultiplexer on side 212)" and the filter (the circulator 225 on side 213) being substantially reflective for signals of said first band entering said bi-directional input

output port (the band traveling from side 212 to side 213 is entering the bi-directional port of the circulator 225 on side 213 via fiber 224) and exiting on said single output port (the band from fiber 224 is enter bi-directional port of circulator 225 on side 213 is exited at output port of the circulator connecting demultiplexer on 213 side). Although the reference of Sakamoto et al does not mention the term "reflective", this is an inherent function of a circulator 225. Examiner cited the patent 5,319,483 to show such inherent feature of a circulator (see Figs. 2 and 3).

Therefore, it is believed that the limitations of claims 1-912-18, 21 and 22 are still met by the combination of Sakamoto, Kakui and Alexander, and the rejection is still maintained.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Krasinski et al (US Patent No. 5,319,483) discloses low cross talk optical circulator.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (703)306-5840.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

JASON CHAN
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TECHNOLOGY CENTER 2600